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## PATENT SPECIFICATION

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## PROVISIONAL SPECIFICATION

## Improvements in and relating to Cigarette Paper

I, EDWARD OLDROYD WHITELEY, a subject of the King of Great Britain, of 30, Church Street, 312 E., New York, State of New York, United States of America, do hereby declare the nature of this invention to be as follows:—

This invention relates to cigarettes, and has for its principal object to provide an improved cigarette of which the ash will not tend to flutter off constantly in flakes or break off at relatively frequent intervals.

Other objects and advantages of the invention will appear in the following description.

Briefly describing the invention, it comprises the treatment to strengthen the ash of the paper wrapper so that it forms an external support for the ashes of more or less continuous though porous tubular form. As the stabilizing elements which may be used in the paper wrapper are inert and sterile, and not adapted to be consumed by the heat of the burning tobacco and paper which forms the combustible structure of the cigarette, there is no change of flavour or aroma of the cigarette.

As an ash strengthening material use may be made of any non-toxic fibres of cellulose which have been suitably purified to remove flavours and which have been rendered fireproof.

Such cellulose fibres may be rendered fireproof by treatment, for example, with liquids or emulsions such as colloidal solutions of magnesia or sodium silicate, such solutions preferably being first passed through a homogenizing machine at pressures up to several thousand pounds per square inch to secure an irreversible emulsion.

The fibres may be dipped in the solution to thoroughly wet them and then freed of surplus fluid, as for instance by centrifugal extraction.

Non-cellulose fibres may also be used in admixture with the above fibres (or alone), such as of spun glass or roasted and purified asbestos.

If glass fibres are used it is preferred to use glass in the form of very fine fibre with a suitable coefficient of expansion,

as well as considerable flexibility and suitable resistance to heat, so as to contribute these properties to the ash as a whole. Such a fibre may be produced by way of example from a glass made from potassium and calcium silicates with added oxide of boron.

The glass fibres appear to fuse slightly at points of touching so as to make a network of supports throughout the ash. The glass fibre has a similar coefficient of expansion to the tobacco when burning, and clings to it as a residuum to form an interlaced external or internal more or less fused skeletal support.

The glass fibre is preferably pre-treated by giving it a thin coating of a hygroscopic substance such as glycerine, licorice extract or admixtures, and preferably with a small percentage of extract of natural tobacco.

The glass fibre is coated, for instance, by spraying or dipping and excess liquid removed, for instance, by centrifuging.

The use of wetting agents such as tri-sodium and alcohol, sulphated lauryl or oleyl alcohol, or the sodium salts of alkylated aryl sulphates, enable a more rapid admixture of fibre with other substances used.

Also other non-cellulose fibres may be used either alone or in admixture with the other fibres mentioned, such as produced by extruding bentonite colloidal mixtures of clay having a microscopic similarity to mica, and having the geometrical dimensions of cotton fibres.

In the process of manufacturing the cigarette paper incorporating, for instance, glass fibre, two examples of suitable procedure might be:—

(1) The glass fibre is first cut to short lengths and is then added to the cellulose pulp by feeding it slowly from a hopper during the slow rotation of the mixing paddles or beaters, this operation being done immediately before the run is made on to the wire screen former, or

(2) The glass fibre is fed evenly from a revolving belt conveyor as a thin layer to the cellulose pulp immediately after the pulp runs on to the wire former at the wet end.

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In both methods the fine glass fibre is forced into the former pulp under pressure of the hot rolls and becomes a part of the composite mass of cellulose pulp and glass fibre emerging from the pressure of the hot rolls in the form of sheets of composite paper. A small percentage by weight of glass fibre to cellulose pulp gives a satisfactory result.

In considering my invention as above set out, it should be noted that several fireproof fibres have been mentioned as suitable for the purpose of the invention but it is to be understood that any other fibres having similar properties may be used.

Dated this 21st day of April, 1939.  
MARKS & CLERK.

### COMPLETE SPECIFICATION

#### Improvements in and relating to Cigarette Paper

I, EDWARD OLDROYD WHITELEY, a subject of the King of Great Britain, of 30, Church Street, 312 E. New York, State of New York, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the manufacture of cigarette paper and has for its principal object to provide an improved cigarette paper of a nature to support and prevent the ash of the cigarette from fluttering off constantly in flakes or breaking off at relatively frequent intervals.

Other objects and advantages of the invention will appear in the following description.

The usual procedure of preparing paper comprises mixing rag or wood pulp fibre and water in a breaker or disintegrator. The pulp is then passed to a beater where more water is added to give a mix of about 85% water and 15% pulp. After beating the pulp is then passed to an apparatus called a machine chest from which it is fed to wire forming screens through apparatus controlling the amount of the pulp and consequently the thickness of the paper mat formed by the screen.

The invention consists in a cigarette paper in which fire resistant fibres are incorporated in an amount about 8% to 20% by weight of the finished paper.

The admixture of fibre resisting, stabilizing or strengthening materials may be added to the pulp during the manufacture of the paper so that when in the finished wrapper it forms an additional external support for the tobacco ashes of more or less continuous though porous tubular form. Such stabilizing or strengthening materials are inert and sterile, and not adapted to be consumed by the heat of the burning tobacco and paper which forms the combustible

structure of the cigarette so that there is no change of flavour or aroma of the cigarette.

As suitable strengthening material for admixture with the paper pulp may be used fibres of cellulose which have been rendered fireproof for example by treatment with liquids or emulsions such as colloidal solutions of sodium silicate or water suspended monodisperse fractions of clay gels, such emulsions or suspensions preferably being first passed through a homogenizing machine at pressures up to several thousand pounds per square inch to secure an irreversible emulsion.

The fibres may be dipped in the solution to thoroughly wet them and then freed of surplus fluid as for instance by centrifugal extraction.

Non-cellulose fibres may also be used in admixture with the above fibres, such as of spun glass.

If glass fibres are used it is preferred to use glass in the form of very fine fibre with a suitable coefficient of expansion, as well as considerable flexibility and suitable resistance to heat, so as to contribute these properties to the ash as a whole. Such a fibre may be produced by way of example from a glass made from potassium and calcium silicates with added oxide of boron.

During the burning of a cigarette wrapper in the cigarette paper of my invention the glass fibres appear to fuse slightly at points of touching so as to make a network of supports through the ash. The glass fibre has a similar coefficient of expansion to the tobacco when burning, and clings to it as a residuum to form an interlaced external more or less fused skeletal support.

The glass fibre is preferably pre-treated by giving it a thin coating of a hygroscopic substance such as glycerine, licorice extract or admixtures, additionally it may be treated with a small percentage of extract of natural tobacco.

The glass fibre is coated for instance by spraying or dipping and excess liquid removed for instance by centrifuging.

- 5 The use of wetting agents such as sodium salts of sulphated lauryl or oleyl alcohols, or the sodium salts of alkylated aryl sulphonates, or glycerol, enable a more rapid admixture of fibre with other substances used.

- 10 Also other non-cellulose fibres may be used either alone or in admixture with the other fibres mentioned, such as produced by extruding highly hydrated colloidal clay such as bentonite from water suspended mono disperse fractions in which the clay particles are first separated out in the form of gels, and which after drying have a microscopic and chemical similarity to mica, and exhibiting similar qualities of heat resistance, the extrusion which I prefer has for example the geometrical dimensions of cotton fibres.

- 25 In the process of manufacturing the cigarette paper incorporating for instance glass fibre, two examples of suitable procedure are given by way of example.

- (1) The glass fibre of about 5 microns diameter is first cut to short lengths of about 3 mm. to 4 mm. length and is then added to the cellulose pulp during the making of the paper, in an amount about 8% to 20% of the weight of the finished paper, by feeding it slowly from a hopper into the beater this operation being done a short time before the run is made on to the wire screen former, or

- (2) The glass fibre is fed evenly from a revolving belt conveyor as a thin layer to the cellulose pulp immediately after the pulp runs on to the wire former at the wet end.

- In both methods the fine glass or fire-proof fibre is forced into the pulp under pressure of the hot rolls and becomes a part of the composite mass of cellulose pulp and glass fibre emerging from the pressure of the hot rolls in the form of sheets of composite paper. A percentage of 0.75 to 1.5 by weight of glass fibre in the pulp gives a satisfactory result.

- When fire proof or glass fibre is used in this process, it is found that the bonding of the fibres mass may be affected or weakened, and therefore, to sustain the strength of the manufactured paper and maintain its bursting point at a suitable standard so that normal speed or faster speed may be maintained as the paper runs from the bobbins during the making of cigarettes, I may add up to about 1% of rubber in the form of latex or chlorinated rubber latex or synthetic

rubber latex emulsions, of the amount of the dry weight of the finished paper. Such rubber compounds should be free from sulphur compounds to avoid imparting an objectionable flavor or odour to the cigarette.

The addition of rubber also restores any loss of stretch or elasticity of the paper consequent on the addition of glass fibres or clay-gel solutions or fibres and its use also increases the affinity of the fibrous particles.

To minimize any objectionable odour due to the presence of rubber during combustion of the paper I include magnesium, sodium, or potassium nitrate.

A suitable method of preparing pulp mixtures for cigarette paper making incorporating the features of my invention, would include as a first step preparation of the complete fibre suspension as usual in paper making to which calcium carbonate is added wet as a slurry, and any other fillers; latex rubber may then be added in a very diluted condition not over 1 to 2% solids, and then the magnesium or similar nitrate and when this is thoroughly mixed, a flocculating agent may be added.

By way of examples the finished dry composition of a number of typical cigarette papers produced according to my invention are now given.

#### EXAMPLE 1

Parts by weight		
82.5	Cellulose Fibre	100
5.0	Moisture	
8.0	Glass or Fire-proof Fibre	
4.0	Calcium Carbonate	
0.5	Rubber	105
0.155	Magnesium Nitrate	

#### EXAMPLE 2

Percentage Composition		
83.0	Cellulose Fibre	
5.0	Moisture	110
8.0	Glass or Fire-proof Fibre	
4.0	Calcium Carbonate	

#### EXAMPLE 3

Parts by weight		
82.5	Cellulose Fibre	115
5.0	Moisture	
8.0	Fire resistant filler produced from Bentonite or colloidal clay as previously described	
4.0	Calcium Carbonate	120
0.5	Rubber	
0.155	Magnesium Nitrate	

#### EXAMPLE 5

Percentage Composition		
83.0	Cellulose Fibre	125
5.0	Moisture	

8.0 Fire resistant filler produced from Bentonite or colloidal clay as previously described

#### 4.0 Calcium Carbonate

5 In considering my invention as set out it should be noted that several fireproof fibres have been mentioned as suitable for the purpose of the invention but it is to be understood that any other fibres having  
10 similar properties may be used.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim  
15 is:—

1. Cigarette paper in which fire resistant fibres are incorporated in an amount about 8% to 20% by weight of the finished paper.

20 2. Cigarette paper as claimed in Claim 1, wherein the fire resistant fibres are incorporated in the paper pulp.

3. Cigarette paper as claimed in Claim 1 or 2, wherein the fire resistant fibres  
25 comprise filaments of glass, preferably 3—4 mm. long and about 5 microns in diameter.

4. Cigarette paper as claimed in Claim 3 wherein the glass fibres are pretreated by coating them with hygroscopic substance, such as glycerol. 30

5. Cigarette paper as claimed in Claim 3 or 4, wherein the glass fibres are prepared from potassium and calcium silicates and boron oxide. 35

6. Cigarette paper as claimed in Claim 1, wherein the fire resistant fibres comprise colloidal clay such as bentonite.

7. Cigarette paper as claimed in any of claims 1 to 6, wherein rubber, chlorinated  
40 rubber or synthetic rubber is incorporated in an amount not exceeding 1% by weight of the finished paper.

8. Cigarette paper as claimed in claim 7, in which the rubber is in the form of latex. 45

9. Cigarette paper as claimed in claim 7 or 8, in which magnesium, potassium or sodium nitrate is also included, preferably magnesium nitrate. 50

10. The improved cigarette paper substantially as described.

Dated this 18th day of May, 1940.

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